

Winston, M. L. and C. H. Michener. 1977. Dual origin of highly social behavior among bees. *Proc. Natl. Acad. Sci. USA* 74:1135–1137.

*J. New York Entomol. Soc.* 97(3):367–370, 1989

**Tree and Shrub Insects of the Prairie Provinces.**—W. G. H. Ives and H. R. Wong. 1988. Information Report NOR-X-292, Northern Forestry Centre, Canadian Forestry Service, Edmonton, Alberta, xi + 327 pp.

This pictorial guide to identification of arthropods that feed on trees and shrubs in the Prairie Provinces culminates the authors' work in that region of Canada; each has devoted about 40 years to the study of forest entomology. They have produced an outstanding manual, one useful to researchers, extension entomologists, horticulturists, and plant inspectors working in regions well beyond the area of coverage. Species affecting native trees and shrubs of the forest vegetation are emphasized (some common exotic plants of field and farm shelterbelts are included), but this volume will interest those who work with ornamentals.

*Tree and Shrub Insects of the Prairie Provinces* is aesthetically pleasing throughout—from its striking and unique cover illustration (larva of forest tent caterpillar on a black background), well-conceived, consistent layout of species write-ups, to the superb color plates. Included among the 117 plates featuring about 1,100 photographs are some of the best images of insects and their injury that we have seen. Depth of field and lighting are remarkably consistent, and the reproduction is excellent. Even their poorest figures, perhaps 45D (carpenter ant nest) and 61G (gypsy moth larva), are better than the majority of those in some publications.

Despite numerous color plates, the book is functional, not extravagant. It was laid out with the reader in mind; as an example, the 8" × 11" pages have margins sufficient for making notes. Paper stock is coated and heavy enough to minimize "see-through"; the binding (perfect, double score hinged) should hold up under extensive use.

A one-page introduction covers objectives and organization of the manual. Introductory material also includes line drawings of adult and immature insects showing various structures (setae of the geometrid larva in Figure 1H cannot be seen, and ocelli might have been indicated for some larvae) and a short glossary. *Cremaster* is defined as the "terminal abdominal segment" of a pupa but actually is the *apex* or *hooked process* of the last segment.

Insects that feed on conifers and on hardwoods are segregated in the table of contents and arranged in each category by plant part attacked (e.g., seeds and cones, foliage, buds or shoots). Mites, caterpillars, sawflies, beetles, and other groups are broken out under plant parts, and each arthropod group is further subdivided to facilitate identification. For instance, lepidopterans attacking conifer foliage are separated into budworms, caterpillars, loopers, miscellaneous larvae, and tube makers. Caterpillars, for example, are further subdivided into the spruce harlequin and its allies, hairy or spiny larvae, and colorful or bizarre larvae.

Some 600 species are covered in the book's main portion. A dark green page precedes the section on arthropods of conifers; a paler green page introduces species of hardwoods so that a reader can locate these major sections in thumbing through the book. One page (always the recto) is devoted to each group of species associated with various parts of conifers or hardwoods. Headings are the same throughout: Distribution, Hosts, and Importance; Life Cycle and Appearance; Damage; and Bibliography (numbers only, which refer to the 657 references cited in the terminal bibliography). Each page of text is accompanied by a color plate on the facing page (verso), making it convenient for the reader. An increase in type size from that used (between 8 and 9 point) would have made the text easier to read but, owing to the length of some write-ups, was not feasible with their one-page format (a decrease in leading might have allowed 10-point typeface to be used).

Information given for each species is necessarily brief but useful and generally accurate. The writing style is good, although on several pages an irritatingly large number of sentences begin with "The," sometimes five or six in succession; in many cases its use is unnecessary. There are fewer typographical errors and misspellings than in most books of comparable size; we found "damage" (p. 7), "Osborne" (rather than Osborn) on p. 117, and "sp." (p. 97) when the plural spp. was needed. Latin names of most taxa, apparently those under discussion, are in bold italics, whereas those noted in passing or not being emphasized are merely italicized. Usage occasionally seems inconsistent and might have been explained in the introduction. Common names for a few species differ from those used in other Canadian publications, for instance, "eastern pine shootborer" and "pine rootcollar weevil" (rather than *shoot borer* and *root collar* as in Rose and Lindquist, 1973).

A few other minor problems we noted were redundancies like "oval in shape," "reddish in color," and similar constructions. For Figure 23C, the legend notes "larval case at arrow," but the arrow is missing. An inconsistency occurs in reference to length of the pentatomid *Banasa dimidiata*: 7–10 mm on p. 65 but 8.5–11 mm on p. 119. An agromyzid fly is referred to inappropriately as a "midge" (p. 213), and it is inaccurate to characterize the life history of the tarnished plant bug, *Lygus lineolaris*, as similar to that of the boxelder bug, *Leptocoris* (or *Boisea*) *trivittatus* (p. 119). The statement that each female aphid lays a single egg on host tissue (p. 107) is misleading when applied to all species under discussion (mainly aphidines); it is accurate in reference to the Pemphiginae.

Coverage of the book, as expected, reflects the authors' research interests and is most complete for defoliators, notably lepidopteran and sawfly larvae. Beetles and most other groups are covered adequately, but treatment of the Homoptera and Heteroptera seems spotty. In the former group only one leafhopper associated with hardwoods is mentioned; among Heteroptera, only three mirids are listed, but numerous species are associated with shrubs and trees in the Prairie Provinces. Several other heteropterans could have been included, e.g., the coreid *Leptoglossus occidentalis* Heidemann, a pest of conifer seed, and the lygaeid *Kleidocerys resedae* (Panzer), which develops extensively in birch catkins. In addition, only one eriophyid species associated with conifers is included.

The bibliography is not meant to be exhaustive, but several key references on particular groups are omitted, e.g., Bailey (1951) for Tingidae and Wood (1982) for Scolytidae. Also useful might have been the guide to plant abnormalities caused by

eriphyid mites (Keifer et al., 1982) and booklet on insect and mite galls of the Pacific Northwest (Larew and Capizzi, 1983). Particularly surprising is the omission of several relevant Canadian works, including Rockburne and Lafontaine (1976), Kelton (1980), McAlpine et al. (1981), and Hamilton (1983, 1985).

Many of these omissions are from the '80's and, although a few works from 1985–1987 are cited, we suspect the authors decided not to incorporate all pertinent literature published during the latter stages of manuscript preparation. A cutoff date for literature perhaps could have been mentioned in the introduction.

Three useful, easy-to-read indexes conclude the book: taxonomic, diagnostic, and insect. Author names might have been spelled out in the taxonomic index instead of using cryptic abbreviations like "K. & Y." or "Bsk."; complete names, however, are provided in the text. The list of arthropod names is uncommonly free of misspellings; it appears that the authors tried to obtain current names. In checking the first group appearing in the taxonomic index—Eriophyidae, for which nomenclatural confusion abounds—we found only a few problems. *Aceria fraxiniflora* (Felt) is a junior synonym of *A. fraxinivorus* (Nalepa), *calaceris* Keifer should be placed in *Aceria* rather than *Eriophyes*, parentheses should be added to the author's name in *A. parapopuli* (Keifer), and parentheses should be deleted from authors' names in *E. emarginatae* Keifer and *E. padi* Nalepa (J. W. Amrine, Jr., personal communication).

The problems and perceived deficiencies just noted are mostly trivial—they do not seriously detract from what is an outstanding volume. But with books of fewer pages and no color sometimes selling for more than \$100, what does this quality reference with extraordinary color plates cost? It is available at no charge—and we would recommend it enthusiastically even if it sold at a typical market price.—*A. G. Wheeler, Jr., Bureau of Plant Industry, Pennsylvania Department of Agriculture, Harrisburg, Pennsylvania 17110, and Gregory A. Hoover, Department of Entomology, Pennsylvania State University, University Park, Pennsylvania 16802.*

#### LITERATURE CITED

- Bailey, N. S. 1951. The Tingioidea of New England and their biology. *Entomol. Amer.* 31:1–140.
- Hamilton, K. G. A. 1983. Introduced and native leafhoppers common to the Old and New worlds (Rhynchotha: Homoptera: Cicadellidae). *Can. Entomol.* 115:473–511.
- Hamilton, K. G. A. 1985. Leafhoppers of ornamental and fruit trees in Canada. *Agric. Can. Publ.* 1779/E. 71 pp.
- Keifer, H. H., E. W. Baker, T. Kono, M. Delfinado and W. E. Styer. 1982. An illustrated guide to plant abnormalities caused by eriophyid mites in North America. U.S. Dep. Agric., Agric. Res. Serv. *Agric. Handb.* 573, 178 pp.
- Kelton, L. A. 1980. The Insects and Arachnids of Canada, Part 8. The Plant Bugs of the Prairie Provinces. *Res. Branch Agric. Can. Publ.* 1703. 408 pp.
- Larew, H. and J. Capizzi. 1983. Common Insect and Mite Galls of the Pacific Northwest. Oregon State Univ. Press, Corvallis, 80 pp.
- McAlpine, J. F., B. V. Peterson, G. E. Shewell, J. R. Vockeroth and D. M. Wood, eds. 1981. *Manual of Nearctic Diptera*. Vol. 1. *Res. Branch Agric. Can. Monogr.* 27, 674 pp.
- Rockburne, E. W. and J. D. Lafontaine. 1976. The Cutworm Moths of Ontario and Quebec. *Res. Branch Agric. Can. Pub.* 1593, 164 pp.

- Rose, A. H. and O. H. Lindquist. 1973. Insects of Eastern Pines. Dep. Environ. Can. For. Serv. Publ. 1313, 126 pp.
- Wood, S. L. 1982. The bark and ambrosia beetles of North and Central America (Coleoptera: Scolytidae), a taxonomic monograph. Great Basin Nat. Mem. 6, 1359 pp.